DOCUMENT RESUME

ED 239 066 CE 037 891

TITLE	Emergency Victim Care. A Training Manual for Emergency Medical Technicians. Module 13--Extrication from Automobiles. Revised.
INSTITUTION	Ohio State Dept. of Education, Columbus. Div. of Vocational Education.
PUB DATE	83
NOTE	31p.; For related documents, see CE 037 879-892.
AVAILABLE FROM	Vocational Instructional Materials Laboratory, Ohio State University, 154 W. Twelfth Avenue, Columbus, OH 43210.
PUB TYPE	Guides - Classroom Use - Materials (For Learner) (051)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Allied Health Occupations Education; Behavioral Objectives; *Emergency Medical Technicians; Equipment Utilization; *First Aid; Job Skills; Postsecondary Education; *Rescue; Textbooks; *Traffic Accidents; Vocational Education
IDENTIFIERS	Emergency Medical Services

ABSTRACT

This training manual for emergency medical technicians, one of 14 modules that comprise the Emergency Victim Care textbook, covers extrication of victims from automobiles. Objectives stated for the chapter are for the student to be able to describe how to use extrication equipment properly and the correct use of the long and short backboards to remove victims from motor vehicles. Informative material is provided on highway accidents, entry to the victim and release from entrapment, use of extrication tools in the rescue service, removal of victims from an automobile, multiple victim removal, and small auto extrication. (YLB)

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EMERGENCY VICTIM CARE

Module 13

—Extrication from Automobiles

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Instructional Materials Laboratory
Trade and Industrial Education
The Ohio State University
College of Education
Columbus, Ohio 43210

Revised 1983

This text is intended for use as a learning aid and to excite your curiosity and eagerness to serve patients. This text is not exhaustive and the opinions and directory comments will change from time to time as new procedures and laws become effective.

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EMERGENCY VICTIM CARE

A TRAINING MANUAL FOR EMERGENCY MEDICAL TECHNICIANS

OHIO TRADE AND INDUSTRIAL EDUCATION SERVICE

DIVISION OF VOCATIONAL EDUCATION
STATE DEPARTMENT OF EDUCATION
COLUMBUS, OHIO

TO THE LEARNER

The 1983 Emergency Victim Care textbook revision has been grouped into 14 modules. The modules have been grouped by content matter as follows:

Module 1

Preface
Foreword
Acknowledgment
Student-Instructor Relationship

Personnel
Emergency Medical Service Vehicles
EMS Communication
Records and Reports

Module 2

Equipment
Safe Driving Practices
Legal Aspects
Controlling the Situation
Action Evaluation Conference

Module 3

Anatomy & Physiology

Module 4

Vital Signs
Patient Assessment

Module 5

Cardiopulmonary Resuscitation (CPR)

Module 6

Bleeding Control
Wounds and Bandaging
Shock

Module 7

Medical Emergencies

Module 8

Crisis Intervention
Drug-Related Problems

Module 9

Backboards/Moving and Handling the Victim
Fractures
Dislocations

Module 10

Injuries of the Eye, Ear, Nose, Abdomen, C.N.S. and Genitalia
Burns and Environmental Injuries

Module 11

Childbirth
Pediatric Emergency

Module 12

Water Accidents
Electrical Emergencies
Hazardous Materials and Radiation Accidents

Module 13

Extrication from Automobiles

Module 14

Appendix I: Communicating with Deaf and Hearing Impaired Patients
Appendix II: Medical Terminology
Appendix III: EMS Organizations
Appendix IV: Legislation
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EXTRICATION FROM AUTOMOBILES

OBJECTIVES

Upon completion of the following chapter, you will be able to:

—describe how to use extrication equipment properly.

—describe the proper use of the long and short backboards to remove victims from motor vehicles.

Following instruction and/or practice, you will be able to:

—demonstrate the various uses of extrication equipment.

—demonstrate procedures to remove victims from motor vehicles using the long or short backboard.

INTRODUCTION

The proper use of the recommended minimal light rescue equipment for the emergency medical service will provide, in the majority of instances, the means to open the wreckage and safely remove the victims. If the wreckage is of such a great magnitude that heavier rescue equipment must be summoned, then it is anticipated that the emergency personnel can utilize the minimal equipment to gain access to the victim and provide the necessary life support measures until the heavy rescue vehicle and equipment arrive to perform their mission. To avoid confusion caused by extra personnel and equipment, the extrication should be performed only by those personnel actually needed. All others should remain out of the way.

THE HIGHWAY ACCIDENT

En route to the accident scene, emergency personnel must anticipate the possible hazards that may be posed by the location and type of emergency. Upon arrival at the scene, every effort must be made to park the emergency vehicle in a position that will provide proper use but will prevent an additional accident or hazard.

A rapid size-up of the accident scene must be made to identify existing situations that may endanger the victim and the emergency personnel such as spilled gasoline or chemicals, escaping gases, downed power lines, and fire. If such hazards exist, the proper agency must be notified and assurance given that immediate assistance will be dispatched. In the absence of a law enforcement officer, and if available workforce and the victim's condition permit, proper warning devices should be placed to alert oncoming traffic.

When the police or other authorities are at the scene, the emergency personnel will avoid assuming their functions. The police can be expected to perform their functions without compromising medical care and will stand ready to assist you when needed.

Proper preplanning will have directed the law enforcement officer at the scene to exert every effort to permit the emergency vehicle access to the scene, afford all possible protection from further danger, and to assure an open lane for the departure of the vehicle.

ENTRY TO THE VICTIM — RELEASE FROM ENTRAPMENT

At one time when teaching extrication, we used to think about removing the victim from the automobile. Today our thinking has changed and we now talk about removing the wrecked auto from around the victim.

Method of gaining access and removing or disentangling a vehicle or parts of a vehicle from around a victim will require different approaches and exercise of ingenuity and good, common sense. No two accidents are exactly alike, although there may be some similarities.

Extreme care must be exercised during the extrication process. During this time, many tools and equipment are close to the victim and the EMT must consider what effects, both physical and mental, this might have on the victim.

The accident victim must receive immediate emergency care before being moved. The only exception would be an impending danger that may threaten not only the victim, but also the emergency personnel. If moving is necessary due to the threat of fire or explosion, the victim must be dragged in line with the long axis of the body.

In many instances, before emergency care can be given, access must be gained to the victim. In the majority of accidents this presents no great problems. Jammed doors can be pried open and sprung. If the victim is pinned in the wreckage during extrication, administer all possible life support care (maintain an open airway, control bleeding and treat for shock). Offer continued reassurance.

STABILIZATION

Rescue procedures may involve stabilization of the vehicle prior to attempting extrication of the victims. In effect, stabilization of the vehicle becomes protection for both the rescuer and the victim. Movement of the vehicle could result in further injury to the victim or injury to the rescuer. Vehicle stabilization may be achieved by using chains, cables, ropes, wood cribbing and wedges. Hydraulic or mechanical jacks may also be used for this purpose.

BATTERY

In most cases, it is recommended the battery be disconnected to reduce the danger of fire. This can be done by cutting or disconnecting the battery cable using battery pliers. All batteries have a positive (+) and negative (−) pole. When cutting or disconnecting the battery cable, the negative (−) cable should be disconnected or cut first and bent well away from the battery (disconnecting is preferred over cutting).

ACCESS THROUGH DOORS

A number of procedures are used to gain access to victims in cases involving locked or jammed doors. These procedures usually involve prying and cutting tools of various kinds to spread or cut metal when providing an opening into the vehicle.

Gaining entry into vehicles manufactured after 1966 is difficult due to the addition of safety

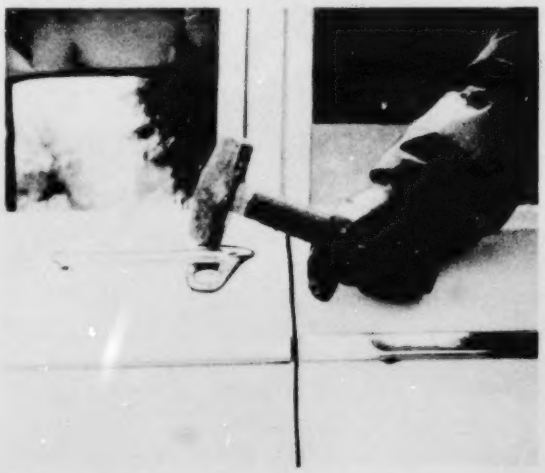


Figure 1. Using hammer to break door handle

latches. Safety latches were made to withstand 4,000 pounds of pressure, preventing the doors from opening on the impact of an accident. Spending much time trying to open locked or jammed doors by force may not be practical. The safety door latch makes this a difficult procedure. Entry through the windows is much faster and easier.

One method of releasing the locking mechanism on doors with surface mounted door handles is to use a hammer and screwdriver. Using the hammer to break off the door handle may allow enough room to insert a screwdriver and trip the lock release bar. See Figure 1.

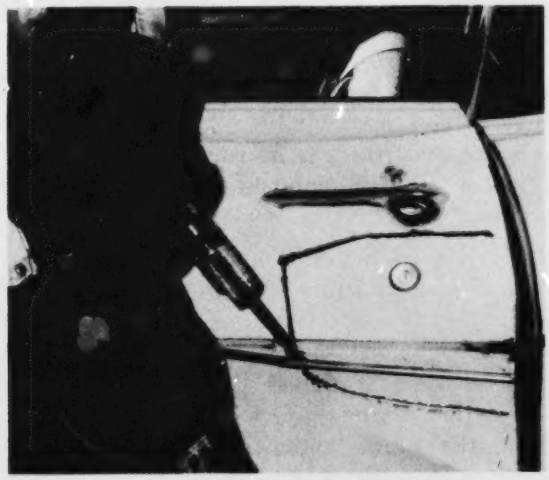


Figure 2. Using air chisel to reach lock bar

If there is not enough room to reach the lock release bar, a larger hole may have to be cut around the door handle by using a panel cutter or air chisel. Panel cutters may be purchased from a body shop supplier or made from a scrap automobile spring. See Figure 2.

The use of a hydraulic rescue unit may be necessary to forcibly open a door. Two hydraulic pumps will be needed when the wedge and spreader attachment tools are used for this procedure. One pump can be used, but it takes longer and makes the job more difficult.

To begin, this procedure will require an opening. A pry bar is forced between the door and

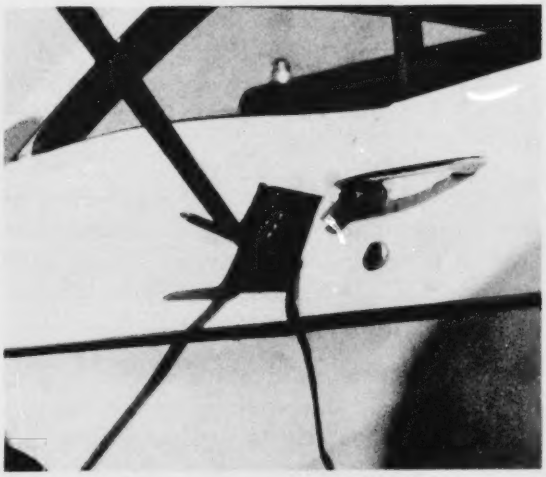


Figure 3. Using pry bar on door

car frame to widen a space sufficiently to make room for the insertion of the spreader. See Figure 3. The wedge may be utilized so that when the hydraulic spreader makes an opening, the wedge can be slipped in as the opening gets larger. See Figure 4. This process should be repeated until the door has been opened. In case of any slippage or breakage of the spreader, the wedge holds the door from springing back.

After the bolt in the locking mechanism has been exposed with the prying or expanding tools,

Figure 4. Using hydraulic spreader to make opening

a hammer and chisel or an air chisel can be used to cut through the rivets in the locking device. Only a heavy duty air gun with the proper air regulator and chisel will cut the safety pin.

Other methods used to open a locked or jammed door require special tools. They will be described later in this chapter.

CUTTING THE STEERING WHEEL

In many vehicle accidents a victim may be trapped between the steering wheel and the front seat. All that may be necessary to release the victim is to manually move the seat back as far as possible with the seat adjusting mechanism. If this is impossible, it may be necessary to cut and remove part of the steering wheel.

The steering wheel is composed of plastic material covering a steel band. A number of tools can be used to cut the steering wheel. A hacksaw or reciprocating saw can be used effectively. This is a two-person operation, one using the saw and the other firmly holding the steering wheel to minimize vibration and rotation. Additional blades must be on hand if it is necessary to replace a broken blade.

A large set of bolt cutters may be used, but due to the limited working space it may be difficult or even impossible. To save time when using the bolt cutters, the plastic covering of the steering wheel should be removed using channel-locking or vise grip pliers. The steel band can then be easily cut.

ACCESS THROUGH WINDOWS

One of the quickest and most effective methods of gaining access to an injured victim is through windows.

Automobiles have two different types of windows, laminated and tempered. Laminated glass is made by bonding two sheets of glass to a sheet of plastic material. When fractured by a force from within or outside the vehicle, the glass will not shatter but will crack. In most cases, the plastic will hold the glass together. This type of glass is used for the windshield.

Tempered glass is plate glass that has been subjected to a hardening process. When broken, it shatters into hundreds of small pieces. Tempered glass is used for the side and rear windows.

REMOVING THE WINDSHIELD

The procedures in removing the vehicle windshield will vary depending upon the make and year of the vehicle. Prior to 1965, windshields were set in a U-shaped rubber channel. By 1969, all passenger cars had Butyl tape-mounted windshields. To determine how the windshield is mounted, look at the metal trim that surrounds the windshield. If there is rubber under the metal trim, the glass is set in a rubber channel. The rear windows have been set in this manner. If there is no rubber visible under the metal trim, the windshield is held in place with Butyl tape.

Removing the windshield or rear window set in the U-shaped rubber channel is not as difficult as it may seem. With one rescuer on either side of the vehicle the metal trim can be removed with a screwdriver, baling hook or some type of flat prying tool. Once the trim is removed, the rubber mounting can be pried or cut away from the glass. Inserting the prying tool or the point of the baling hook behind the glass, near the top, will allow the rescuer to lift out the top part of the glass. See Figure 5A. As soon as the top is free, the bottom will pivot and the glass easily can be lifted out. See Figure 5B.

The fastest way to remove the laminated glass windshield set in Butyl tape is by using a fire axe. Cutting should be done as far away from the victim as possible. The victim should be protected from flying glass with some type of blanket. The glass will break, but the plastic inner liner will prevent large pieces of sharp or pointed glass from reaching the victim.

Breaking the tempered glass in the rear window or the side windows is the easiest and

Figure 5A. Prying top part of windshield

quickest method of gaining access to the victim. The glass can be shattered by striking the windows in the lower corner with a sharp pointed tool. Be careful not to use too much force when breaking the glass. Striking the glass with too much force may shower the occupants of the vehicle with glass. Once a small hole is made in the glass, a rescuer with gloves can reach inside and remove the remainder of the glass. Pull the pieces of glass to the outside of the vehicle. Do not push them in toward the occupant(s).

Figure 5B. Lifting out windshield

Positioning a blanket behind the glass when it is shattered will protect the victim. The glass can be removed by pushing the blanket to the outside of the vehicle.

The rear window can be removed by striking the glass at the lower corner on each side, making a small hole. The holes can be enlarged from the bottom to the top, close to the outer edge of the window. A blanket can then be passed through the holes from one side to the other. See Figure 6.

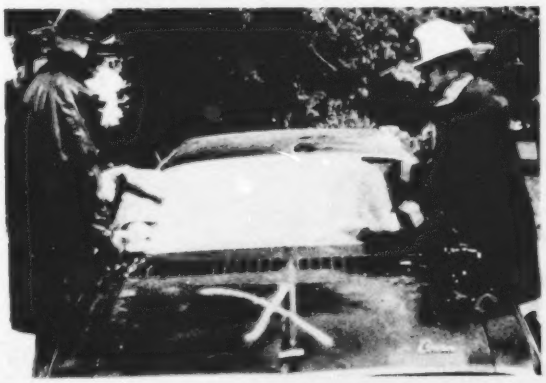


Figure 6. Removing rear window with blanket

Both rescuers should simultaneously pull the top of the blanket to the outside, then pull the bottom of the blanket to the outside. The glass will fall to the outside of the vehicle and should be cleared from the trunk deck. This prevents the rescuers from being cut or injured when entering the vehicle.

USE OF EXTRICATION TOOLS IN THE RESCUE SERVICE

SAFETY

Safety at the scene of an automobile accident is the responsibility of all personnel involved in the rescue operation. Additional injury to the victim or the rescue personnel only compounds a serious situation.

All emergency medical personnel should be trained to use the tools of the rescue service. **Only through practice will rescue personnel be proficient in the use of these tools.** The following safety rules are recommended.

1. Wear full protective clothing: helmet, coat, gloves, goggles, and boots.

2. Fire equipment must be available to flush fuel spillage or toxic material from the area. Charged lines must be ready in case the vehicle catches fire.

3. Provide adequate illumination at the scene. The rescue personnel must see what they are doing.

4. Warning devices should be placed around the accident scene. Give adequate warning to motorists of an emergency situation and provide a safe working area at the accident scene.

5. When using rescue tools, secure the best footing possible under the circumstances. This not only aids in the safety of the rescuer, but reduces fatigue.

6. Position rescue vehicles upgrade from the accident. If there is a gas spill or the gas tank ruptures, vehicles positioned downgrade from the accident may be damaged or destroyed.

7. Damaged vehicles must be stabilized using blocks, cribbing, chains, rope or cables.

8. Check and maintain fluid level in all hydraulic tools and equipment.

9. Keep fuel tanks full on all gasoline motor-operated tools. If the fuel tanks are full, in most cases they will not have to be refueled during the rescue opertion.

10. Never refuel gasoline motors when they are hot. Wait at least five minutes.

11. Never start the motor in the area of refueling. Move the tool at least 10 feet from the refueling area.

12. Have the proper fire extinguisher ready for use in the refueling area.

13. Use only blades, gasoline and oil mixture, and parts that are recommended by the manufacturer.

14. Manufacturers of rescue equipment provide operational procedures and safety rules with their equipment which should be reviewed by all personnel. Only by following their recommendations can the rescue personnel expect to make the most effective use of the tools or equipment.

Size up accident scene for all hazards. If electrical transmission lines are down, take all necessary precautions to minimize any additional danger at the scene. Use the "buddy system." Another EMT may see a hazard you cannot see when you are working.

WARNING: Never stand in direct line with spreading or cutting tools when they are in operation. Be prepared to move quickly in case the tools or equipment malfunction.

Safety checks of all rescue equipment before and after use should be part of the rescue squad's everyday operation. The equipment must work when needed. There may not be a second chance.

ROTARY SAWS

Rotary saws have been used in the fire and rescue service for a number of years. Both electric and gasoline-motor powered units are available. Most saws used in the rescue service are of the two-cycle engine variety. The units vary

in weight from 24 to 30 pounds and generate rotating speeds to approximately 6,000 R.P.M.

Various types of blades are available to cut metal, concrete, wood, and composition materials. Reinforced, abrasive blades are used to cut metal. Careful consideration should be given before using this saw. **This unit does produce a large amount of sparks and smoke and creates a fire hazard.** See Figure 7.

Courtesy Sharon Township Fire Dept., Worthington

1. *Portable electrically powered reciprocating saw*
2. *Blades*
3. *Safety goggles*
4. *Gasoline powered rotary saw*
5 & 6. *Rotary saw blades*
7. *Safety gloves*

Figure 7. Power saw equipment

AIR CHISELS

In recent years the air-powered chisel has become an accepted and popular tool for cutting metal. Few sparks are generated by this tool, yet there is always the possibility of fire when cutting metal. Fire equipment must be available to extinguish any fires encountered.

Air chisels are available in two pressure ranges: 80 to 100 p.s.i. and 200 and 250 p.s.i. It is recommended that a heavy-duty air gun, capable of working in the 200 to 250 p.s.i. range, utilizing the rate of 10 cubic feet per minute, be used.

When using the high-pressure air gun, self-contained breathing mask air tanks will allow approximately four minutes of operating time. This period of time may seem short but roof post and other vehicle metal can be cut with little difficulty.

Air pressure regulators with air thread in the 200 to 250 p.s.i. range, capable of 10 cubic feet per minute discharge, should be used with the high-pressure air gun. The air hose should be ⅜" heavy-duty, oil and grease resistant, and capable of handling the recommended pressure.

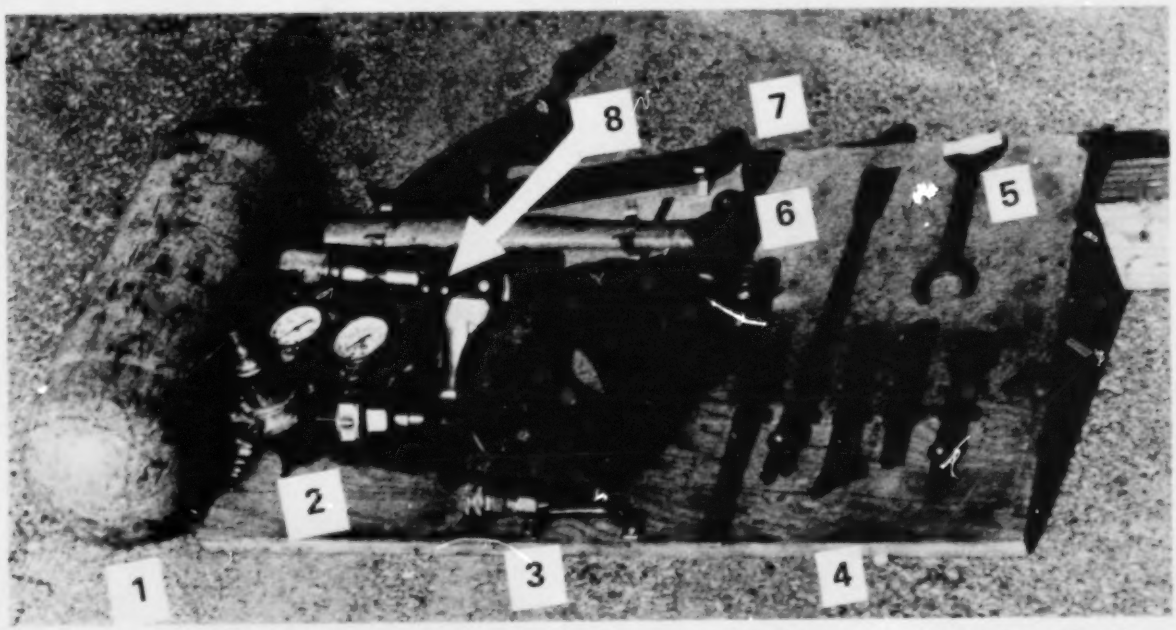
Tool holders to retain the chisels in the air gun should be the screw-on type and not spring-loaded. The fittings should be quick-release.

A variety of chisels can be used. The half moon for cutting doorposts and sheet metal is the most commonly used. See Figure 8.

Remember, the air chisel is only as effective as the rescuer trained in its use. Only by practice will the rescuer learn the limitations of the tool. Additional pictures on the use of the air chisel are in the chapter on "School Bus Accidents" in the "Victim Rescue" manual (available from the Instructional Materials Laboratory, The Ohio State University).

HYDRAULIC RESCUE UNIT

The hydraulic rescue unit is a versatile tool that has been used for many years. It is an ideal tool for forcible entry into a vehicle or to spread, push, pull or lift metal that has entan-



Courtesy Sharon Township Fire Dept., Worthington

1. *Air tank*
2. *Air regulator*
3. *Air hose*
4. *Chisels*
5. *Wrench*
6. *Hammer*
7. *Pry bar*
8. *Air gun*

Figure 8. Air chisel equipment

gled a victim trapped in a vehicle. The units can be purchased in a number of sizes. The four-ton and 10-ton units are the most commonly used in the rescue services. The four-ton unit is used for gaining access to the victim. In most cases, the 10-ton unit will be needed to disentangle victims that may be completely entrapped by the vehicle. This unit provides more power and has additional attachments that can be "customized" to fit almost any situation.

This unit is an ideal tool that can be used where a fire hazard exists or where there is very little working room. Gaining access to or disentangling the victim using this tool may reduce the danger or psychological fears associated with noise and the possibility of additional injuries that can be caused by using other rescue tools. Setting up the unit to fit a particular situation involves a certain amount of time, but with proper training and practice, the time for setup can be minimized.

The unit consists of a remote hydraulic pump, hose, and ram. Depending upon the size of the unit a number of extension tubes from three to 20 inches are provided. The extension tubes may have threaded ends of quick connectors. Additional attachments and chains can be assembled to spread, push, pull or lift.

With practice the rescuer will learn the advantages, disadvantages and limitations of the unit. Reputable manufacturers provide instructional and operational manuals with their units. The tool will be serviceable for many years with proper maintenance and use. The following guidelines should be remembered in order to operate the tool safely.

Do not attempt to exceed the capacity of the ram.

There is a possibility of pushing the plunger out of the top of the ram.

Be careful not to overextend the plunger.

Protect all the threads on the unit. When assembling threaded connections, always screw attachments as far down as possible.

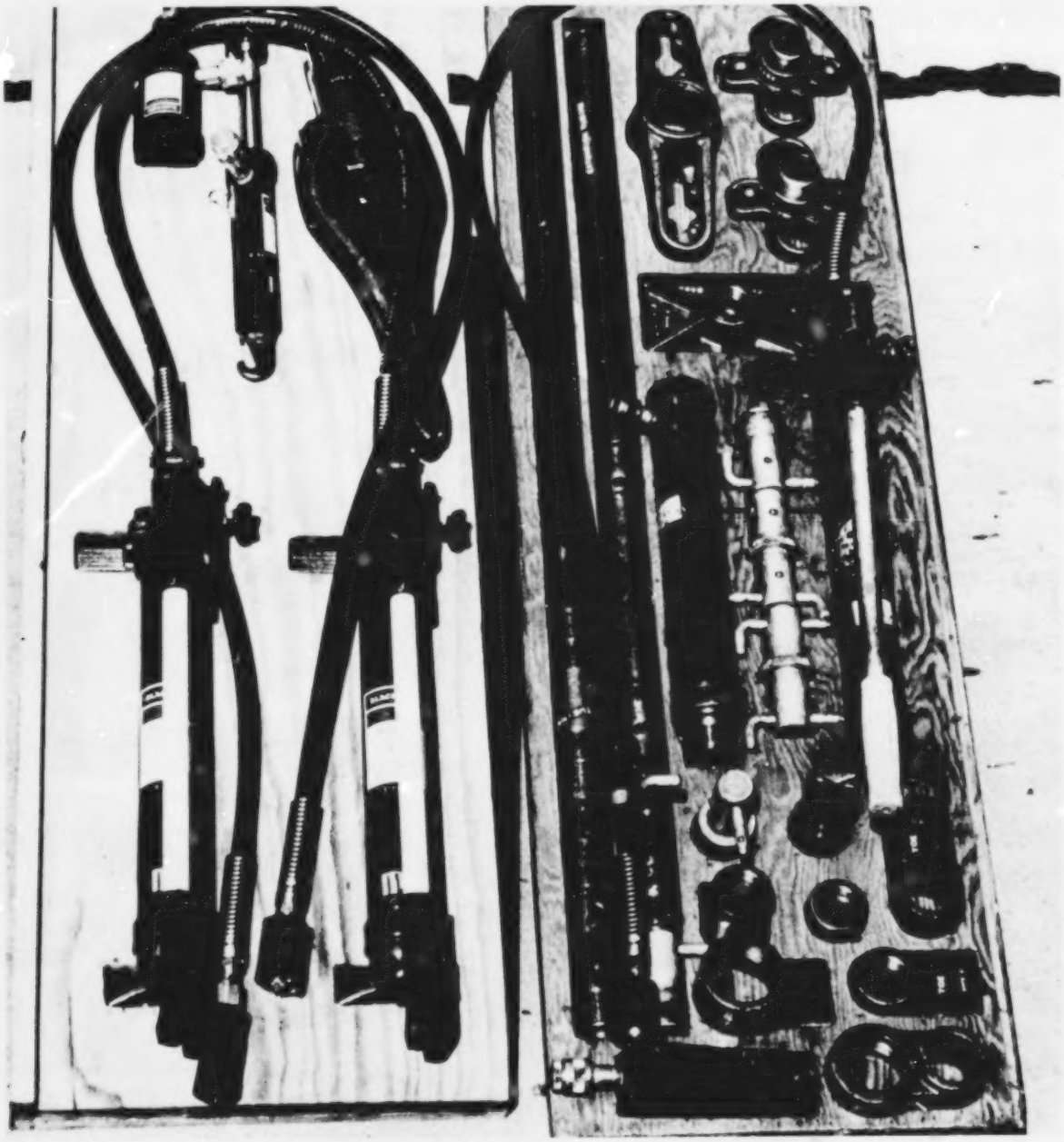


Figure 9. Hydraulic rescue unit

Make every effort to center loads on the plunger. Off-center loads produce strain on the ram, plunger and extension tubes.

Maintain fluid levels and keep oil lines and couplers clean.

Protect hose from heat, fire, grease and oil. Do not drop heavy objects on the hose. The wire strands that strengthen the hose may kink causing breakage. See Figure 9.

HYDRAULIC RESCUE JAWS

A recent development in rescue tools is the hydraulic rescue jaws. The jaws can be operated by electric power or a two-cycle, five-horsepower gasoline engine. Though expensive it is a versatile, high-powered, self-contained, maintenance-free hydraulic spreading and pulling tool.

The unit consists of a power unit, rescue jaws, grab hooks, cutting heads, chains and hooks. The unit operates in any position, requires only a one-person operation and offers 10,000 pounds of usable force. The unit is capable of exerting five tons of force at the jaw tips. The opening and closing time for the arms is 11 seconds without load for a fast advance and 40 seconds under a load. Using special application snap-on jaws, the tool is instantly customized to spread,

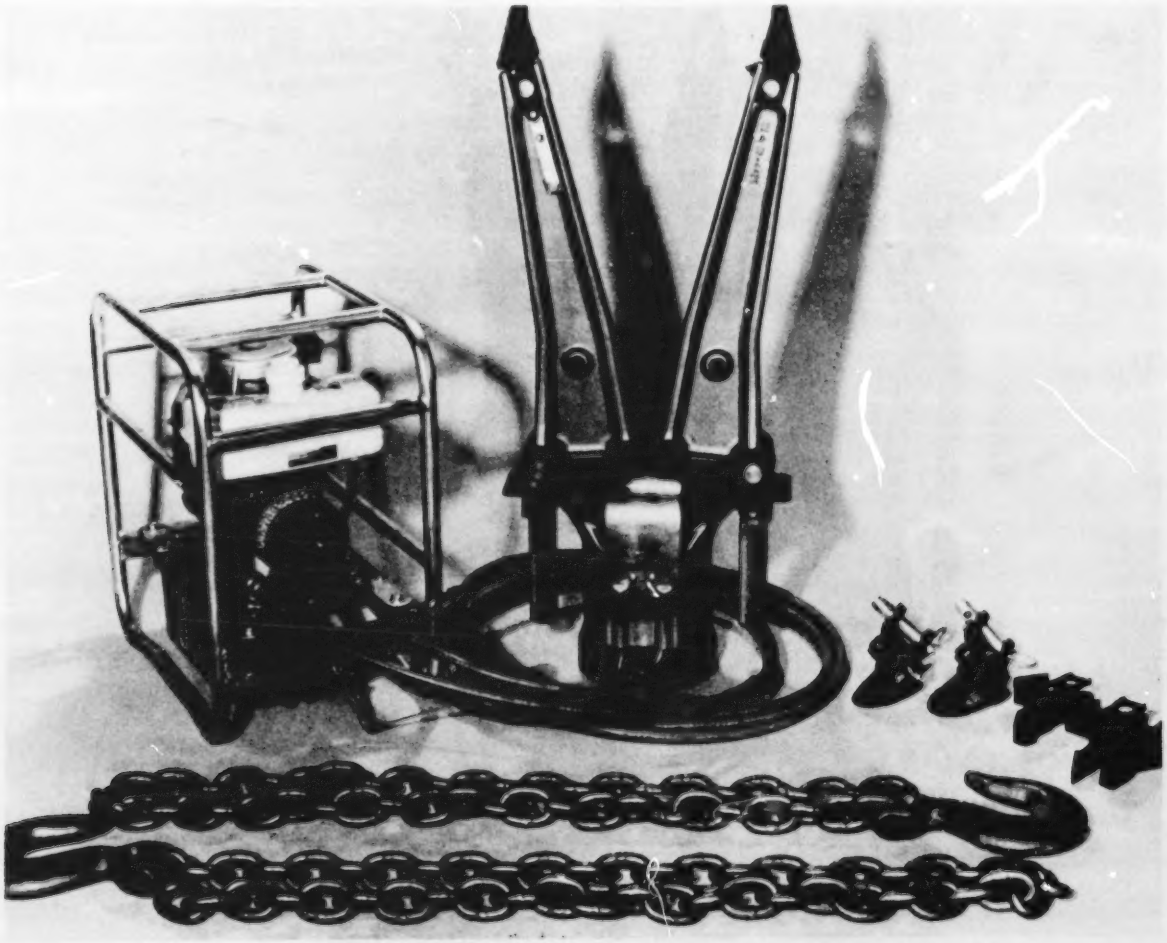


Figure 10. Hydraulic rescue jaws

pull, cut, shear, or pierce.

This tool does not take the place of all other rescue tools. It is an addition to the tools normally carried. See Figure 10.

COME-A-LONG

The come-a-long is an inexpensive tool used to pull out a seat or steering column or to forcibly open a door. The capacity for these tools is one and one half to two tons. Both cables and chains are used as a working part of the tool.

Since it has a limited capacity, do not overextend the tool beyond its capacity. Keep rescuers clear of the chains or cables. These chains or cables may break, injuring the victim or other rescuers. See Figure 11.

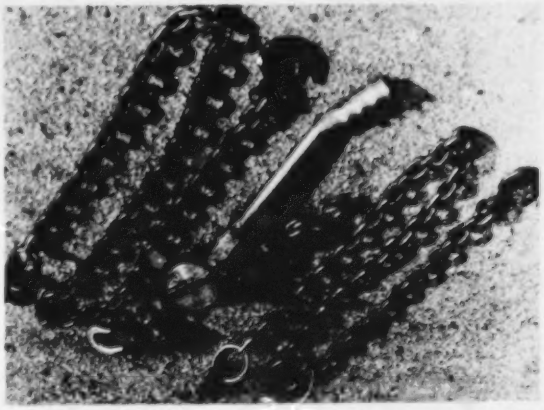


Figure 11. 1½ ton come-a-long and chains

RECIPROCATING SAWS

The portable electrically powered saw is lighter and more compact than gasoline engine-powered saws. Because of its size and weight it is an ideal tool when working in areas of limited space. A variety of blades are available to cut metal, plastic and wood. The proper blades should be selected to cut the materials on which you are working.

When used properly, this tool can cut a vehicle apart. With the proper blade this tool will cut sheet metal such as the roof, doorpost, steering wheel, clutch and brake petals and other components. The saw produces a clean cut and few sparks. To prevent broken blades, hold the soleplate firmly against the metal being cut and avoid sudden pushes and sharp turns. See Figure 7.

REMOVAL OF VICTIMS FROM AN AUTOMOBILE

Victims of auto accidents are especially likely to have head, neck, and back injuries. Moving these victims carelessly may result in needless deaths and permanent paralysis. All emergency medical personnel must learn the procedures for removing a victim: (1) from the driver's seat, (2) from under the dashboard, (3) from a position across the front seat, and (4) from the back floor or seat.

Some of the victim removal procedures require more than the usual number of responding personnel. Other persons such as police officers, relatives, or bystanders can be shown how to help. Do not hesitate, however, to call headquarters for additional help if it is needed to carry out an involved procedure.

The EMT must remember that the following are not hard fast rules. There may be times when a certain procedure cannot be carried out just as this training manual prescribes. However, the EMT can adapt to a situation by using **basic EMT knowledge and adding ingenuity and good, common sense.**

REMOVAL FROM THE FRONT SEAT-SITTING POSITION OF A CONSCIOUS VICTIM WITH NO SUSPECTED HEAD, NECK, OR BACK INJURIES

To provide as much working room as possible, attempt to slide the front seat back gently while supporting the victim. See Figure 12.

If the victim is conscious and does not have any suspected head, neck, or back injuries, but due to other injuries must be removed from the vehicle, the following procedure can be followed.

Figure 12. A car seat can be slid back

An EMT takes a position behind the victim, in the back seat. See Figure 13. The EMT slides the hands under the victim's wrists and crosses the victim's arms.

As this is being done, one EMT stands ready with the backboard and another EMT stands at the opposite door.

Figure 13. The victim is grasped by the arms

The EMT in the car then arches the back against the car roof and raises the victim just enough to slide the board under the victim. See Figure 14.

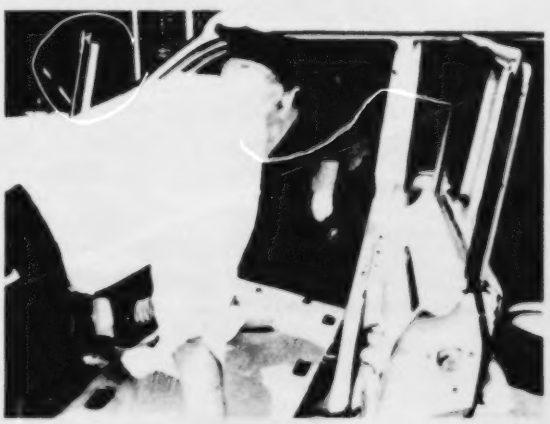


Figure 14. One EMT slides the board

The victim is then pivoted on the board. Both feet are kept together at all times. The EMT in the back seat then "gives" the victim to the EMT at the opposite door, who lowers the victim to a horizontal position. See Figure 15.

Figure 15. The victim is pivoted

All three EMTs then come to the driver's side. Together they slide the victim out of the car. Figure 16 shows the victim being transferred to a cot.

REMOVAL FROM THE FRONT SEAT-SITTING POSITION OF AN UNCONSCIOUS VICTIM WITH NECK AND/OR BACK INJURIES.

All unconscious victims of auto accidents must be suspected of having neck or back injuries and must be properly immobilized before removal attempts are made.

The half board serves as an effective tool to immobilize sitting victims with suspected neck or back injuries or for victims in awkward positions. Two nine-foot long straps are used to secure the victim to the board. Figures 17 through 26 point out the important steps of this procedure.

Figure 16. The victim is removed

Figure 17. The victim's head is supported prior to and during immobilization

Figure 18. With continued support to the victim's head and neck, an improvised cervical collar is applied. A commercial cervical collar of the proper size can be used but, as shown, two universal dressings folded longways are wrapped around the victim's neck and held in place with a soft roller bandage.

Figure 19. As shown, the short board is being positioned behind the victim while the victim's head is being supported. Because of low doorways on many cars, it may be necessary to pass the head end of the board in first and then position the board properly behind the sitting victim.

Figure 20. Before securing the victim to the board, a neck roll is placed to pad the existing hollow space behind the neck. This can also be made from folded universal dressings and rolled to the proper size.

Figure 21

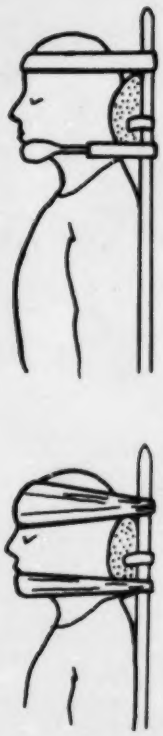


Figure 21A

Figures 21 & 21A. The victim's head is now secured to the board. Commercial straps with Velcro fasteners (hook-loop type) can be used, or the head can be secured as shown with two cravat bandages or a soft roller bandage. Attention must be given to the airway at all times. Cravat bandages should be tied with a bow to allow easy removal should the victim regurgitate.

Two nine-foot straps of a material that will slide easily are used to secure the victim to the board. The position of the straps is very important.

Figure 22

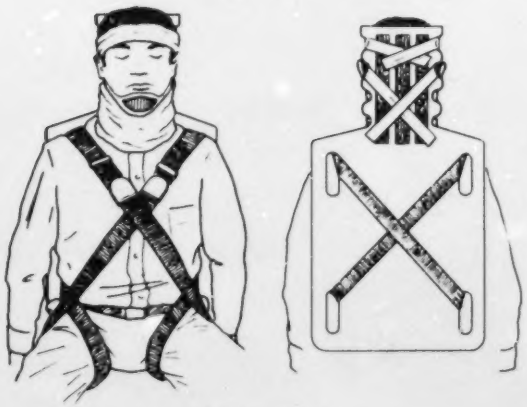


Figure 22A

Figures 22 & 22A. The victim is secured to the board. The straps go through the top hand hole, from front to back, cross behind the board to the opposite lower hand hole, coming from back to front, then going over the thigh at the groin, under and around the outside of the thigh, up across the chest to the buckle. The long straps must be positioned well up under the thighs and snug about the chest.

Figure 23

Figure 23. The victim is now ready for removal. For a large victim, it is recommended the victim, being secured to the short board, be pivoted in the seat and put on a long board for removal, similar to the procedure shown in Figures 14, 15 and 16.

Figure 24. A victim that can be handled by EMTs can be removed by lifting the victim out secured to the short board as shown. The EMTs must hold the victim high up under to avoid sagging on the board. The EMT's other hand grasps the board at the top hand holes.

Figure 25. The victim can now be placed on a long backboard. The chest straps must be loosened so that the legs can be extended.

Figure 26. The victim and the short board are both secured to the long board. The victim is now ready for transportation.

BUILD-A-BOARD STRETCHERS

The build-a-board is an improved extrication device with four basic sections, i.e., two seat sections and two upper torso sections.

EMTs with basic knowledge are expected to use ingenuity and common sense to make this improved extrication device fit the occasion, as few accidents are exactly alike. Any emergency medical service having this device should practice with simulated victims to become completely familiar with the equipment. See Figure 27.

Figure 27. Build-A-Board stretchers

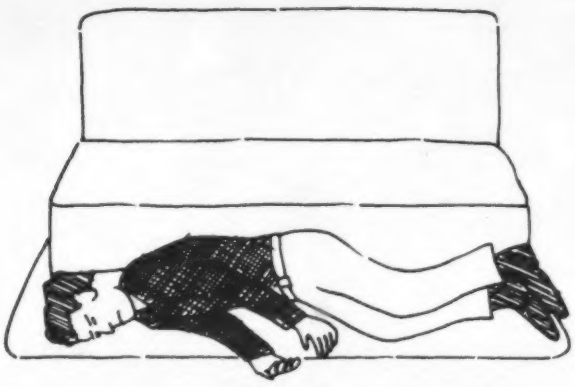


Figure 28

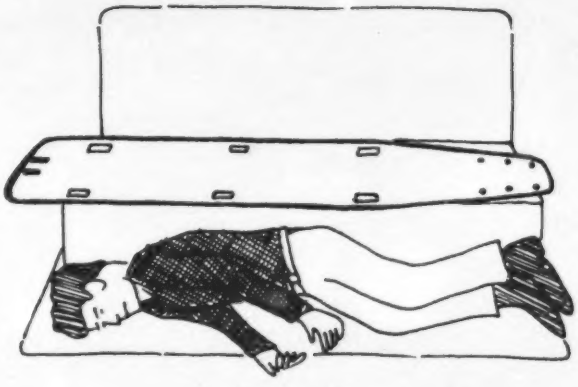


Figure 29

Figure 28 shows a victim lying under the dashboard of an auto. After giving emergency care to the victim, EMTs will place a backboard on the front seat as in Figure 29.

Figure 30. EMT at right is attending the victim's feet while the EMT at the left attends the victim's head. Two EMTs approach the victim from the back seat. One grasps the victim's upper clothing while the other grasps the victim's belt and thigh.

REMOVAL FROM UNDER DASHBOARD

A victim might typically be found in the position shown in Figure 28. Four EMTs will be needed to remove the victim.

After the victim is given emergency care, a board is placed on the front seat. See Figure 29.

The rescuers then prepare to roll the victim onto the board as follows.

1. One EMT should be in position to support the victim's head. The EMT controls its movement at all times during the maneuver.

2. One EMT is placed in a position to support the victim's legs.

3. Two EMTs get into the back seat, reach over the front seat, and grasp the victim's clothing at the shoulder, chest, belt and thigh. See Figure 30.

On a signal, all four EMTs gently lift the victim, keeping the back and hips against the front of the front seat.

The victim is then placed on the board. See Figure 31.

The victim on the backboard is slid out of the car and transferred to the cot.

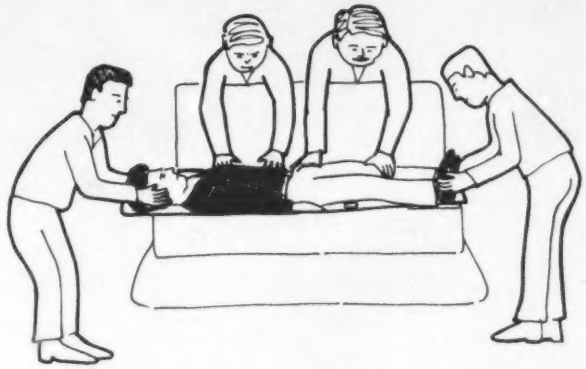


Figure 31. The victim is slid on a backboard.

REMOVAL FROM FRONT SEAT

Many times a victim is injured and falls across the front seat.

Four people are also needed for this rescue procedure as follows.

1. Two EMTs get into the back seat. The top EMT supports the victim's head and grasps the clothing at the shoulder. The second EMT grasps the victim's belt and clothing at the thigh.

2. One EMT outside the car prepares to guide the victim's feet.

3. One EMT handles the board. Later the EMT will attend the victim's head.

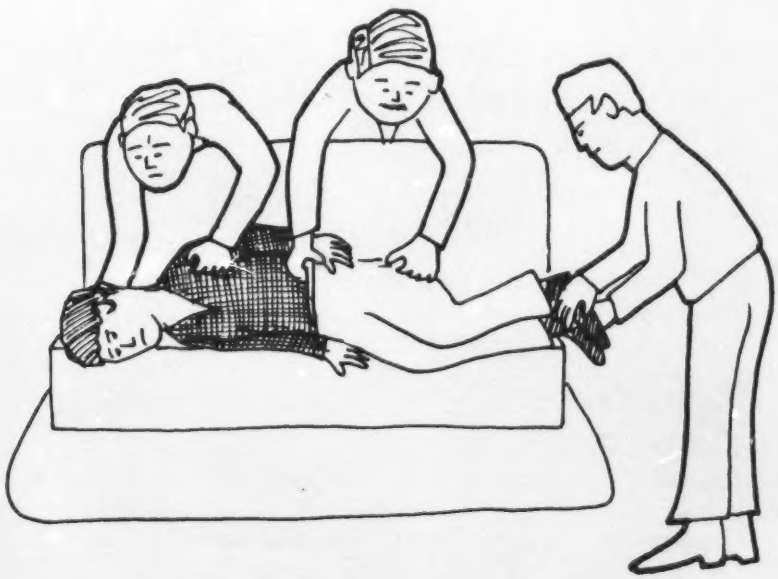


Figure 32. EMTs are preparing to move the victim. Note positions of each EMT's hands.

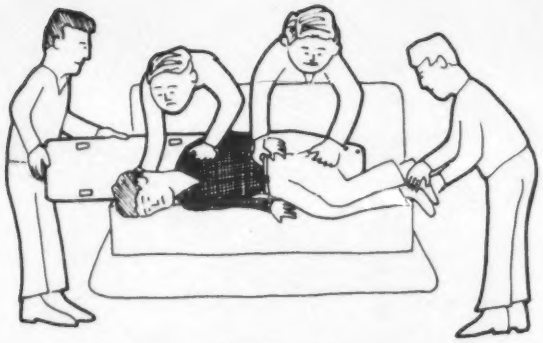


Figure 33

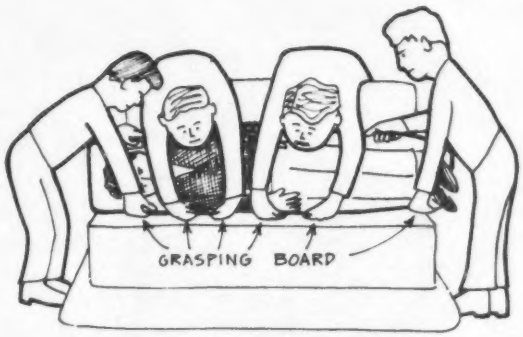


Figure 34

The victim is slightly rolled while one EMT places a board behind the victim (Figure 33). Then EMT holds the victim's head against the board with lower arm, as the hand grasps the backboard edge (Figure 34).

The victim is rolled slightly away from the back of the seat, and the board is slid behind the victim. (See Figure 33.)

After the board is in place, the EMT who handled it becomes top EMT and supports the head of the victim against the board with the arm, while grasping the bottom edge of the board. (See Figure 34.) If a neck injury is suspected, another EMT can support the head and neck from outside the auto.

Note: A cervical collar should be applied before moving the victim.

The two EMTs in the back seat then reach across the victim, grasping the clothing under the ribs, waist, hip, and thigh. Together they hold the victim snugly against the board. (See Figure 34.)

The bottom EMT (on the outside of the car) grasps the top of the board with the top hand. The EMT reaches around the victim's ankles and grasps the board at its bottom edge, at the same time keeping the victim's feet against the board.

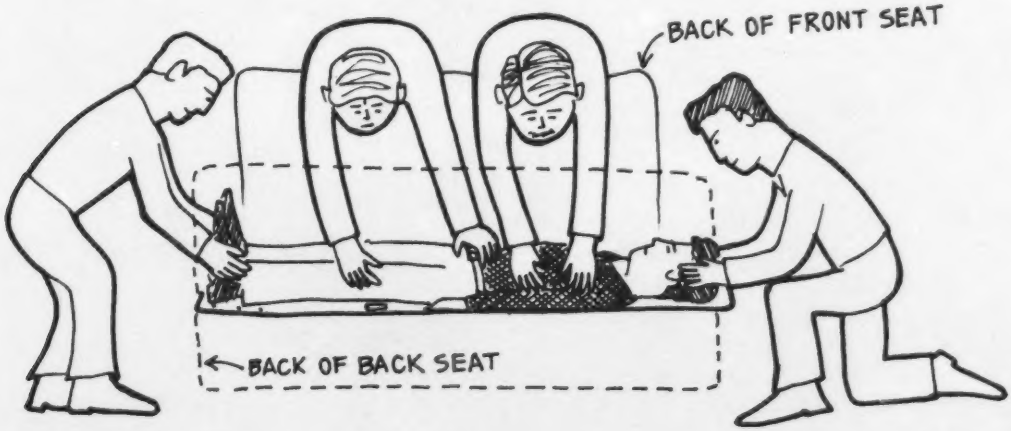


Figure 35. EMTs place their hands on the victim as shown.

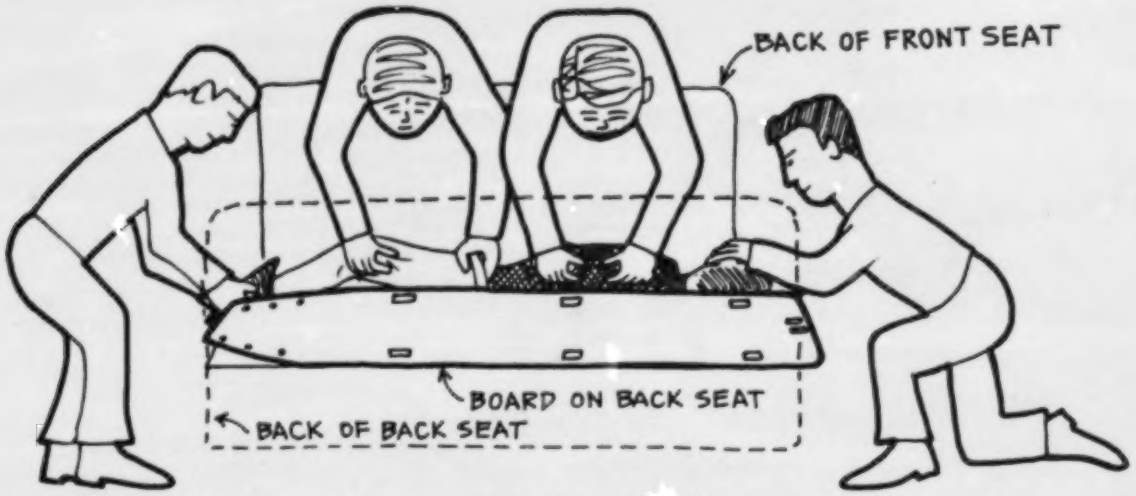


Figure 36. The EMTs place the victim on the board. In this view, the back seat has been removed from the car.

On a signal all four EMTs turn the board, keeping the victim tight against the board.

The board is now resting on the front seat. The victim can be removed as previously shown.

REMOVAL FROM THE BACK OF CAR

People riding in the rear seat of a car can as easily be injured in a wreck as those in the front seat.

To remove this victim, four EMTs grasp the victim using the same hand position as those shown in Figure 32. However, the two EMTs in the car are in the front seat. These two EMTs grasp the victim as shown in Figure 35.

A board is placed on the seat and the victim is raised to the board. The victim's back should be kept against the front of the back seat as support. The head, neck, legs, and back must be continually supported.

The back seat can be removed and the board put on the floor. The victim can then be supported and logrolled onto the board more easily. See Figure 36.

MULTIPLE VICTIM REMOVAL

It is not uncommon to arrive at the scene of an automobile accident and find three or four injured victims in the vehicle.

Once the size-up has been made and emergency care applied to the victims, it is then necessary they be removed from the wrecked vehicle. A general procedure has been established in Figures 37 through 40. The vehicle is a two-door hardtop and, due to the assumed damage, access can only be made through the right front door. The point to be made is that the removal of one victim clears the way for the removal of the next.

THE PRECEDING SITUATION CANNOT BE ESTABLISHED AS A HARD FAST RULE OR METHOD, BUT IS PRESENTED ONLY TO SERVE AS A GUIDE AND A REMINDER THAT ALL ACCIDENT VICTIMS MUST BE HANDLED CAREFULLY AND THAT REMOVAL SHOULD IN NO WAY AGGRAVATE EXISTING INJURIES.

No two auto accidents are identical, and the situation at the scene will dictate the proper action to take. The ability of the emergency personnel to size up the situation and to exercise their initiative with a cool, level head will result in successful extrication of the injured.

Figure 37. The passenger in the right front seat is removed first. The victim has been given all necessary care and is being removed on a backboard.

Figure 38. The driver is removed next. All injuries have been dressed and a splint has been applied. Notice the EMT reassuring the victims in the back seat.

Figure 39. The front seat is now clear. Additional victim care is administered. The front seat is slid forward and the seat backs tilted down, providing room to apply splints or use a backboard. The passenger in the right rear seat will be the third victim to be removed.

Figure 40. The fourth victim in the left rear seat is the last to be removed. The victim has been reassured throughout the entire procedure. The method of removal will be according to the extent of injury. If necessary, a backboard will be used.

SMALL AUTO EXTRICATION

The number of small cars on the road today is increasing constantly. For this reason, it is important the EMT realize the special problems entrapment in small cars may present. First, the small car does not offer the protection to the occupants as the larger, heavier car.

At the present time, little research has been done regarding the extrication of victims from small cars. However, the victims may be found in the same positions in small cars as they are in larger cars. The problem is the methods used to remove the victims from the larger automobiles do not work in all cases for smaller cars. The half backboard, for example, is difficult—if not impossible—to use in the smaller cars. Because most of the smaller automobiles have a console located between the seats with a gearshift lever in the center, it is easy to determine that a backboard cannot be placed across the front seat.

As previously stated, the smaller cars offer little protection for the occupants when involved in an accident. Victims have been found literally wearing the car.

Those rescuers with experience in small car extrication have found it best to remove the roof of these small cars to allow room to free the entrapped victims.

CONCLUSION

A wrecked car should be obtained by every EMS and should be used often at drills to practice removal of victims. The car can be turned on its side or top, and the victims can be brought out through side windows and through the windshield or back window.

Available EMS Publications

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